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CLAIMS

* 1. A device for measuring a quantity of fuel injected by an injector (2) used in a combustion engine including;

5 - a first measuring chamber (8) into which the fuel is injected,

10 - a pressure sensor (62) respectively measuring the pressure in the first measuring chamber (8),

15 - a temperature sensor (60) measuring the temperature in the first measuring chamber (8), downstream of the first chamber (8), a second measuring chamber (20) which is connected to the first chamber (8) by a drain pipe (18) and the volume of which can vary according to the movement of a piston (38), the displacement of which is measured using a displacement sensor (46),

20 - means allowing the first (8) and second (20) measuring chambers to be drained at least partially,

25 - an electronic section analyzing information received through the sensors (46, 60, 62) and controlling the draining means in particular, characterized in that:

- the means of draining the first chamber into the second chamber comprise a high-speed solenoid valve (32),

30 - the means of draining the second chamber (20) comprise a high-speed solenoid valve (52),

35 - the electronic section is designed to control the means of draining the first chamber (8) and the second chamber (20) so as, on the one hand, to partially drain the first measuring chamber (8) after each injection until the pressure in the first measuring chamber returns to

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essentially the pressure that was in this chamber prior to this injection and, on the other hand, to partly drain the second chamber (20) after each measurement of the volume of each injection.

5 2. The measuring device as claimed in claim 1, characterized in that the electronic section comprises a compensating device to make it possible to take account of any pressure difference there might be in
10 the first measuring chamber (8) after two successive drainings.

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15 3. The measuring device as claimed in of claim 1 or 2, characterized in that the means of draining the first measuring chamber (8) comprise a back-pressure regulator (34).

20 4. The measuring device as claimed in one of claims 1 to 3, characterized in that the means of draining the second measuring chamber (20) comprise a back-pressure regulator (54) intended to keep the pressure in the second chamber at a reference value.

25 5. The measuring device as claimed in one of claims 1 to 4, characterized in that the piston (38) is preloaded by a spring (44) urging it toward the second measuring chamber (20).

30 6. The measuring device as claimed in one of claims 1 to 5, characterized in that the piston (38) moves in a smooth-walled cylinder (36) and in that it comprises an annular groove (56) open toward the wall of the cylinder (36).

35 7. The measuring device as claimed in one of claims 1 to 6, characterized in that it includes a cooling system for cooling the injector (2), the first measuring chamber (8), the piston (38) and the piston displacement sensor (46).

8. The measuring device as claimed in claim 7, characterized in that the fluid used in the cooling

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system is the same as the fluid used for performing the injections.

9. A method for measuring characteristics of an injection of fuel performed by an injector of the type consisting in using a first chamber for measuring the pressure and the temperature of injection and a second chamber for measuring the volume of fuel injected, characterized in that it further consists, in particular, for each injection;

- 10 - in measuring the pressure and the temperature in the first chamber prior to the injection,
- in injecting fuel into the first chamber using the injector,
- during injection, measuring, at least regularly, the pressure and the temperature in the first chamber,
- 15 - at the end of injection, draining some of the fuel contained in the first chamber into the second chamber until the pressure in the first chamber returns roughly to the pre-injection pressure,
- 20 - measuring the volume of the drained fuel and from it deducing the volume of the injection,
- draining some of the fuel contained in the second chamber.
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10. The measuring method as claimed in claim 9, characterized in that it consists in correcting the values relating to each injection using, in particular, prerecorded calibration data.

- 30 - 11. The measuring method as claimed in claim 9 or 10, characterized in that it consists, when draining the second chamber, in performing this draining until a reference pressure is established in that chamber.